

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference AZ06-007WOWW	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">FOR FURTHER ACTION</div> <div style="text-align: right; font-size: small;">see Form PCT/ISA/220 as well as, where applicable, item 5 below.</div> </div>	
International application No. PCT/KR 2006/000298	International filing date (<i>day/month/year</i>) 26 January 2006 (26.01.2006)	(Earliest) Priority Date (<i>day/month/year</i>) 1 February 2005 (01.02.2005)
Applicant <div style="text-align: center;">LG ELECTRONICS INC.</div>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☒ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see continuation of this first sheet.

2. ☐ Certain claims were found unsearchable (see continuation of this first sheet)

3. ☐ Unity of invention is lacking (see continuation of this first sheet)

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in the continuation of this first sheet. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. 2

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

Continuation of first sheet**Continuation No. IV:****Text of the abstract****(Continuation of item 5 of the first sheet)**

The present invention relates to a washing machine with a double rotor type motor. The washing machine includes a tub (2) for holding washing water, a double rotor having an outer rotor (10) with outer magnets (11) supported on an inside circumferential surface, and an inner rotor (20) on an inner side of the outer rotor (10) with inner magnets (21) supported on outside circumferential surface, a bearing housing (70) having a hub (71) at a rear wall of the tub (2) for supporting a rotation shaft (4) connected to the double rotor, and extensions (75) from the hub (71) fixed to an outer surface of the tub (2), and a stator (30) having cores (31) with opposite surfaces arranged to face the outer magnets (11) and the inner magnets (21), a coil (34) wound on an outside surface of each of the cores (31), with an insulating material applied to an outside surface, a molded portion (33) insert molded to outside surfaces of the core (31) and coil (34) such that the opposite surfaces of the cores (31) are exposed, and a fastening portion (35) extended from the molded portion (33) and secured to the hub (71).

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 2006/000298

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁸: **D06F 37/30** (2006.01); **D06F 37/26** (2006.01); **H02K 16/02** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁸: D06F, H02K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, esp@cenet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2004/004098 A1 (AMOTECH CO., LTD) 8 January 2004 (08.01.2004) page 35, line 23 - page 37, line 3; figs 9c, 15 --	1-22
Y	EP 1094144 A2 (LG ELECTRONICS INC.) 25 April 2001 (25.04.2001) paragraphs [0019], [0025]; figs 2b, 2c, 3, 6. --	1-22
Y	EP 1055765 A1 (KABUSHIKI KAISHA TOSHIBA) 29 November 2000 (29.11.2000) paragraphs [0024] - [0039]; figs 1 - 6. ----	1-5, 7, 20-22

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
16 January 2009 (16.01.2009)Date of mailing of the international search report
17 February 2009 (17.02.2009)Name and mailing address of the ISA/ AT
Austrian Patent Office
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR 2006/000298

Patent document cited in search report			Publication date		Patent family member(s)	Publication date
WO	A	2004004098			JP A 2008048599	2008-02-28
					US A1 2008054740	2008-03-06
					KR A 20040002349	2004-01-07
					US A1 2006066173	2006-03-30
					US A1 2004245878	2004-12-09
					WO A1 2004004098	2004-01-08
EP	A	1094144			KR A 20010037670	2001-05-15
					KR A 20010037668	2001-05-15
					KR A 20010037667	2001-05-15
					KR A 20010037666	2001-05-15
					JP A 2001178989	2001-07-03
					CN A 1515732	2004-07-28
EP	A	1055765			KR A 20030036546	2003-05-09
					US B1 6474114	2002-11-05
					CN A 1274782	2000-11-29
					EP A1 1055765	2000-11-29
					TW B 4720948	2002-01-11
					JP A 2000334194	2000-12-05

PATENT COOPERATION TREATY

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year)	17 February 2009 (17.02.2009)
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Applicant's or agent's file reference
AZ06-007WOWW

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/KR 2006/000298

International filing date (day/month/year)
26 January 2006 (26.01.2006)

Priority Date (day/month/year)
1 February 2005 (01.02.2005)

International Patent Classification (IPC) or both national classification and IPC
D06F 37/30 (2006.01); D06F 37/26 (2006.01); H02K 16/02 (2006.01)

Applicant

LG ELECTRONICS INC.

1. This opinion contains indications relating to the following items:

- ☒ Cont. No. I Basis of the opinion
- ☐ Cont. No. II Priority
- ☐ Cont. No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Cont. No. IV Lack of unity of invention
- ☒ Cont. No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Cont. No. VI Certain documents cited
- ☐ Cont. No. VII Certain defects in the international application
- ☐ Cont. No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ AT
Austrian Patent Office
Dresdner Straße 87, A-1200 Vienna
Facsimile No. +43 / 1 / 534 24 / 535

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Continuation No. I

Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of a translation from the original language into the following language: ENGLISH, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

Continuation No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-22	YES
	Claims ----	NO
Inventive step (IS)	Claims ----	YES
	Claims 1-22	NO
Industrial applicability (IA)	Claims 1-22	YES
	Claims ----	NO

2. Citations and explanations:

The following documents have been cited in the search report:

D1: WO 2004/004098 A1

D2: EP 1094144 A2

D3: EP 1055765 A1

Document D1 relates to a radial core type double rotor brushless direct-current motor in which a double rotor structure is employed with inner and outer rotors which are doubly disposed and thus a stator core is completely divided. The motor includes a rotational shaft which is rotatably mounted on a housing of an apparatus, cylindrical inner and outer yokes which are rotatably mounted on the center of the housing, inner and outer rotors including a number of magnets which are mounted with the

opposing polarities on the outer surface of the inner yoke and the inner surface of the outer yoke, and a number of cores assemblies which are installed between the inner and outer rotors in which a number of coils are wound around a number of division type cores, respectively.

Document D2 describes a structure of a driving unit in a drum type washing machine including a tub for storing washing water, a drum of a metal rotatably mounted inside of the tub disposed horizontal to the ground, or with an angle to the ground for accommodating laundry therein, a shaft connected to the drum mounted inside of the tub through the tub for transmission of a driving force of the motor to the drum, bearings fitted onto outer circumferences of both end portions of the shaft for supporting the shaft, a bearing housing having stator fastening bosses at fixed intervals along a circumference of a central portion thereof for supporting the bearings, a stator having a plurality of magnetic cores each formed by stacking magnetic laminations each having a salient pole projected outward in a radial direction and a rib projected inward in a radial direction, both of which are formed as one unit, frames of insulating material for covering top and bottom surfaces of a magnetic core assembly of the magnetic cores, and coils each wound around each of the salient poles of the magnetic cores, a cup formed rotor having a rotor body of iron or iron alloy with a sidewall, a back yoke, forming a magnetic flux path and a rear wall formed as a unit with the sidewall, and permanent magnets fitted to a setting surface of an "L" formed bent portion of the sidewall, and a connector connecting the rotor and the shaft, thereby reducing noise and troubles as well as a power loss, to improve a productivity of the rotor and the product.

Document D3 discloses a drum type washing machine that includes an outer cabinet, a water tub mounted in the outer cabinet and having a rear end plate, a generally drum-shaped rotating tub rotatably mounted in the water tub and having a rear wall, a rotating tub shaft mounted on a center of the rear wall of the rotating tub and having a rear end projecting rearward to be located in the rear of the rear end plate of the water tub, an electric motor for rotating the rotating tub via the rotating tub shaft, the motor including a stator mounted on the rear end plate of the water tub and a rotor connected to the rear end of the rotating tub shaft, and an aligning structure for aligning a center of rotation of the rotor and a center of the stator.

The present application relates to a washing machine with a double rotor type motor. The washing machine includes a tub for holding washing water, a double rotor having an outer rotor with outer magnets supported on an inside circumferential surface, and an inner rotor on an inner side of the outer rotor with inner magnets supported on outside circumferential surface, a bearing housing having a hub at a rear wall of the tub for supporting a rotation shaft connected to the double rotor, and extensions from the hub fixed to an outer surface of the tub, and a stator having cores with opposite surfaces arranged to face the outer magnets and the inner magnets, a coil wound on an outside surface of each of the cores, with an insulating material applied to an outside surface, a molded portion insert molded to outside surfaces of the core and coil such that the opposite surfaces of the cores are exposed, and a fastening portion extended from the molded portion and secured to the hub.

Neither of the prior art documents cited in the search report discloses a washing machine with a double rotor type motor including a bearing housing having a hub at a rear wall of the tub for supporting a rotation shaft connected to the double rotor, and extensions from the hub fixed to an outer surface of the tub, and a stator of the motor having a molded portion (or an insulator) with fixing portion extended from the molded portion (or from the insulator) and secured to the fastening portion of the bearing housing, consequently the subject matter of independent claims 1, 21 and 22 is new.

Nevertheless, document D1 discloses a double rotor type motor for a washing machine, and documents D2 and D3 describe bearing housing having a hub with extensions fixed to an outer surface of the tub of a washing machine, so the subject matter of claim 1 seems to lack inventive step.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
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Neider of the dependent claims 2-20 contains any feature, which, combined with the features of any claim to which they refer, defines subject matter that meets the requirement for inventive step, because the features are disclosed in the above mentioned documents or considered to be obvious to a person skilled in the art as common general knowledge. Similarly, the subject matter of independent claims 21 and 22 seems to lack inventive step either.

Industrial applicability is given.
